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(57) Abstract

A system and method for routing telephone calls, data and other multimedia information through a hybrid network which may include transfer of information across the internet. Profile information is utilized by the system throughout the media experience for routing, billing, monitoring, reporting and other media control functions. The system can include prioritized routing. The system can also facilitate callback sessions and present a display to a caller via a web page that includes status information pertaining to the callback session. Calls and callbacks can also be routed over the hybrid network. Through use of the system, users can manage more aspects of a network than previously possible, and may control network activities from a central site.

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the modem PPP interfaces.

9. The priority flow specifications are managed through the controller process (**11430**). The controller process can accept externally placed priority reservations through the external control application programming interface (**11440**). The controller validates priority reservations for particular flows against admission control procedures and policy procedures, and if the reservation is admitted, the flow specification is entered in the flow specification table in the packet classifier (**11450**) via the process to process interface (**11465**). The process to process interface (**11465**) need not be identical to the process to process interface (**11485**), but the same selection of techniques is available.

XXIII. CALLBACK TELEPHONY SYSTEM

A. Introduction to a Callback Telephony System in Accordance with a preferred Embodiment

In today's telephony environment, a caller must contact an operator to initiate a conference call and/or have all parties dial a common number to connect into a conference call. This requires the cost of a human operator and the inconvenience of dialing a predefined number to be carried as overhead of each conference call. It also makes it very inefficient to schedule a conference call and assure that all parties are available to participate. It also requires a dedicated number for all the parties to access to facilitate the call

In accordance with a preferred embodiment, a callback system is facilitated by a caller accessing a display from a computer and filling out information describing the parameters of a call. Information such as the date and time the call should be initiated, billing information, and telephone numbers of parties to participate in the call could be captured. Then, based on the

information entered, a central or distributed computing facility with access to the hybrid network transmits e-mail in a note to each party required for the call copying the other parties to verify participation and calendar the event. The e-mail would include any particulars, such as the password associated with the call and time the call would be commenced. The necessary network facilities would also be reserved to assure the appropriate Quality of Service (QOS) would be available, and when the date and time requested arrived, the call is initiated by contacting each of the participants whether they be utilizing a telephone attached to a PSTN or a voice capable apparatus (such as a computer or intelligent television) attached to the hybrid network. At any time during scheduling, initiation or duration of the call, any party could request operator assistance by selecting that service from the display associated with the call. Thus, a completely automated callback system is provided for call setup and control.

For callers that utilize the callback system on a regular basis a custom profile is provided as an extension to the users existing profile information. The custom profile allows a user to store frequent conference call participants information. The profile contains participant's telephone numbers (which could be DDD, IDDD, IP Address or Cellular phone number), E-mail address, paging service, fax number, secretary phone number, location, time zone, working hours and other pertinent information that will be useful for initiating a call. Default profiles based on company or organization needs are also enabled and can be tailored to meet the needs of a particular user based on more global information.

Billing information would also be provided online. A user could enter a pre-arranged billing number or the ability to bill to a credit card or telephone number. If billing to a telephone number, the system treats the call like a collect or third party call to verify billing.

If profile information were predefined for a particular call scenario, then

another option would allow an immediate connection of a conference call or single call at the press of a button, much as speed dialing is performed today except that more than one caller could be joined without intervention of the calling party, Internet callers are supported and an operator can be joined as required.

B. Internet-Based Callback Architecture

The following information discusses the detailed architecture of an internet-based callback architecture in accordance with a preferred embodiment. A block diagram of the architecture is illustrated in Figure **114B** in accordance with a preferred embodiment. The callback call flow commences when a caller **11412** calls into a local internet service provider **11419** as illustrated in Figure **114B** at **11410**. The caller addresses the callback server **11414** to access the callback home page **11411** through the internet **11419**, shown as an internet cloud labeled Basic Internet Protocol Platform **11419**. At the callback server home page **11411**, the caller enters, sees and/or updates default information such as: callback Internet Protocol (IP) address, call-to phone number (or multiple phone numbers to initiate a conference call) and charge-to method at a minimum. Other information, such as one or more numbers comprising entry of a Direct Distance Dialing (DDD), International Direct Distance Dialing (IDDD) or an Internet Protocol (IP) address can be utilized to specify a phone number or internet computer with voice capability. In addition, a date and time can be prearranged for staging the callback operation. Additional information that can be captured at the callback server home page **11411** is detailed below in specific examples designed to elaborate and clarify in accordance with a preferred embodiment.

Then, at **11420**, the callback server **11414** send a message to the callback switch **11432** with the appropriate calling information, and the callback

switch **11432** initiates the callback leg as shown by step **11430** of the call through the Public Service Telephony Network (PSTN) **11435** to the destination specified by the caller whereby the callback caller answers the incoming call to **11437**. Once the caller end of the call is prepared, then the callback switch initiates call-to call leg(s) which connect the call through path **11440** through PSTN **11445** to telephone set **11446** and/or **11447**. Once all of the callers have been connected, then when the status of the call changes, an exception condition is indicated on the display if it is an IP call, or an audio indicia of the condition is transmitted to the callers if they are utilizing a standard telephony device. A change in status could be a caller hanging up or a glitch occurring in the transmission. The exception conditions are also captured for quality of service analysis.

When the call is initiated utilizing the information entered into the callback server home page **11411**, as part of the initialization of the callback session, a separate temporary webpage is created which is accessible to all members of the callback via a password selected by the initiator of the callback session. While all of the callers are being connected and throughout the duration of the telephony experience, the status of the call leg changes, and exception conditions, are indicated on the temporary created status webpage, or an audio indicia, where appropriate, of the condition is transmitted to the callers if they are utilizing a standard telephony device. Then, as callers are connected, removed, or change status, the display is updated to reflect the status of each participant's connection. In addition, as the call progresses, participants can drag and drop files, video clips or any other information which would be utilized as collaborative material during the call. Each participant would be required to move information to their personal computer before the call terminated, since the webpage is temporary and is deleted upon termination of the call. The temporary webpage is password protected to avoid unauthorized access to the information contained in the webpage.

C. *Callback Service Potential*

The callback service includes support for one-to-one calling, one-to-many calling (conference calling, fax broadcast, text-to-speech message delivery, voice-to-voice message delivery, conference call reservation whereby the server sends E-mails to call-to participants with the conference call details, the server sends fax to call-to participants, or the server sends a text-to-speech message to call-to participants.

D. *Internet Service Potential*

Real-time view of the status of each conference call participant, ANI and an alphanumeric representation to identify each participant entered by the initiator when a call is "reserved" can be displayed on screen as participants connect to conference. This information is captured as part of the call record set forth earlier and detailed in the appendix.

In an alternative embodiment, a conference call without callback leg is enabled. In this embodiment, a callback customer participates through a Voice Over Network (VON) application utilizing a computer with voice capability, and can initiate a video screen popup on the computer display for manual operator assistance as detailed above in the description of a video operator.

E. *Internet-Based Callback Architecture*

In an internet based callback architecture as illustrated in Figure **115**, the callback caller dials into a local internet service provider **11512**. Then, the caller addresses the host server **11514** containing the callback home page **11510 11511**. At the callback server home page **11511**, the caller enters the information described earlier including a callback Internet Protocol (IP) address, call-to phone number (or multiple phone numbers to initiate a

conference call) and charge-to method at a minimum. Then, for the callback call flow to initiate the call, the callback server **11514**, where the callback server home page **11511** is located, transmits a message to the callback switch **11532** with the necessary calling information generated from the callback home page **11511**. Finally, the callback caller utilizing the internet service provider **11512** to establish a voice IP session with the initiating client **11535**. The callback switch **11511** then initiates the call-to call leg(s) routing the call **11540** out over the public service telephony network **11541** to a telephone set **11542**.

F. Self Regulating System

An expert system monitors each call in accordance with a preferred embodiment. The system includes rules that define what logic to execute when an exception occurs. The rules include specialized processing based on whether the call is routed via a PSTN or the internet. In addition, the system includes a default connection to a manual operator if no other correction of the connection is available. For example, if a caller hangs up during a teleconference and other callers are still connected, an exception message is sent to each of the still connected callers informing them of the status change. Another aspect of the expert system is to ensure quality of service (QOS) and produce reports indicating both integrity and exceptions. Scheduling of resources is tied to this expert system, which regulates whether calls can be scheduled based on available or projected resources at the time of the proposed call. For example, since all calls used by this system are initiated by the callback switch (item **11432** in Figure **114B** and item **11532** in Figure **115**), if there are insufficient outgoing trunk ports during the period of time that a callback subscriber requests, then the callback subscriber is prompted to select another time or denied access to the resources for that time. This is utilized to predict when additional ports and/or resources are required.

While various embodiments have been described above, it should be understood that they have been presented by way of example only, and not limitation. Thus, the breadth and scope of a preferred embodiment should not be limited by any of the above described exemplary embodiments, but should be defined only in accordance with the following claims and their equivalents.

APPENDIX

Table 301 - CDR/PNR Record Format:

Word #, Bit #	Description
Word 0, bits 0-3	Call Record Id (CRID): Identifies the record type. 0 = Default 1 = CDR 2 = SER 3 = PNR 4 = OSR 5 = POSR 6 = ECDR 7 = EPNR 8 = EOSR 9 = EPOSR 10-15 = Not Used
Word 0, bits 4-15	Call Disconnect ID (CDID): Identifies the call record. Each call record has a unique ID number. These 12 bits contain the 12 least significant bits of the CDID.
Word 1, bits 0-15 Word 2, bits 0-15	Timepoint 1 (TP1): A binary count of the number of seconds that occurred between midnight (UTC) on January 1, 1976, and the time that the incoming call was detected by the switch.
Word 3, bits 0-12	Timepoint 3 (TP3): A binary count of the number of seconds between Timepoint 1 and the time the outgoing signalling protocol was completed; that is, the number of seconds that it took for the switch to connect to the outgoing trunk.
Word 3, bits 13-15 Word 4, bits 0-9	Timepoint 6 (TP6): A binary count of the number of seconds between timepoint 1 and the time Answer Supervision was detected or received. This is the time that it took for the call to be answered by the person or audio system being called.
Word 4, bits 10-15 Word 5, bits 0-15	Timepoint 7 (TP7): A binary count of the number of seconds between timepoint 1 and the time that the originating or terminating party disconnected whichever is first.
Word 6, bits 0-15 Word 7, bits 0	Originating Port (OP): The absolute port number of the originating trunk. Originating trunk is the line on which the call came to the switch.
Word 7, bits 1-15 Word 8, bits 0-1	Terminating Port (TP): The absolute port number of the last terminating trunk seized for an outgoing call attempt. The terminating trunk is the last line on which the call is transmitted.
Word 8, bits 2-14	Originating Trunk Group (OTG): A binary number expressing the Originating Trunk Group number of the originating trunk. An originating trunk group is a group of ports coming from the same location.
Word 8, bits 15 Word 9, bits 0-11	Terminating Trunk Group (TTG): A binary number expressing the Terminating Trunk Group number of the Terminating trunk. A terminating trunk group is a group of ports going to the same location. If a call fails because no trunks are available, record the last trunk group number that was attempted.

FIGURE 114B

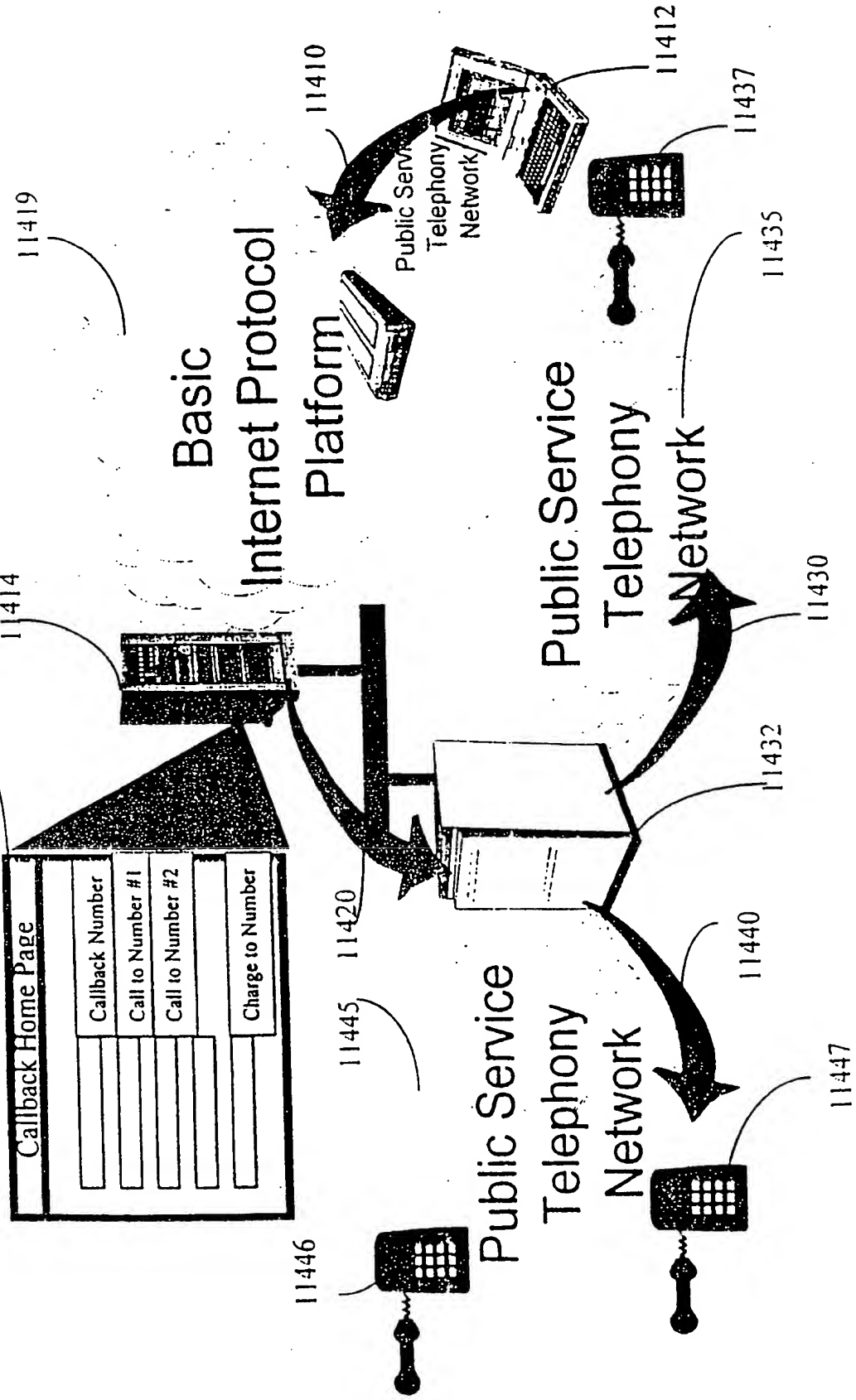
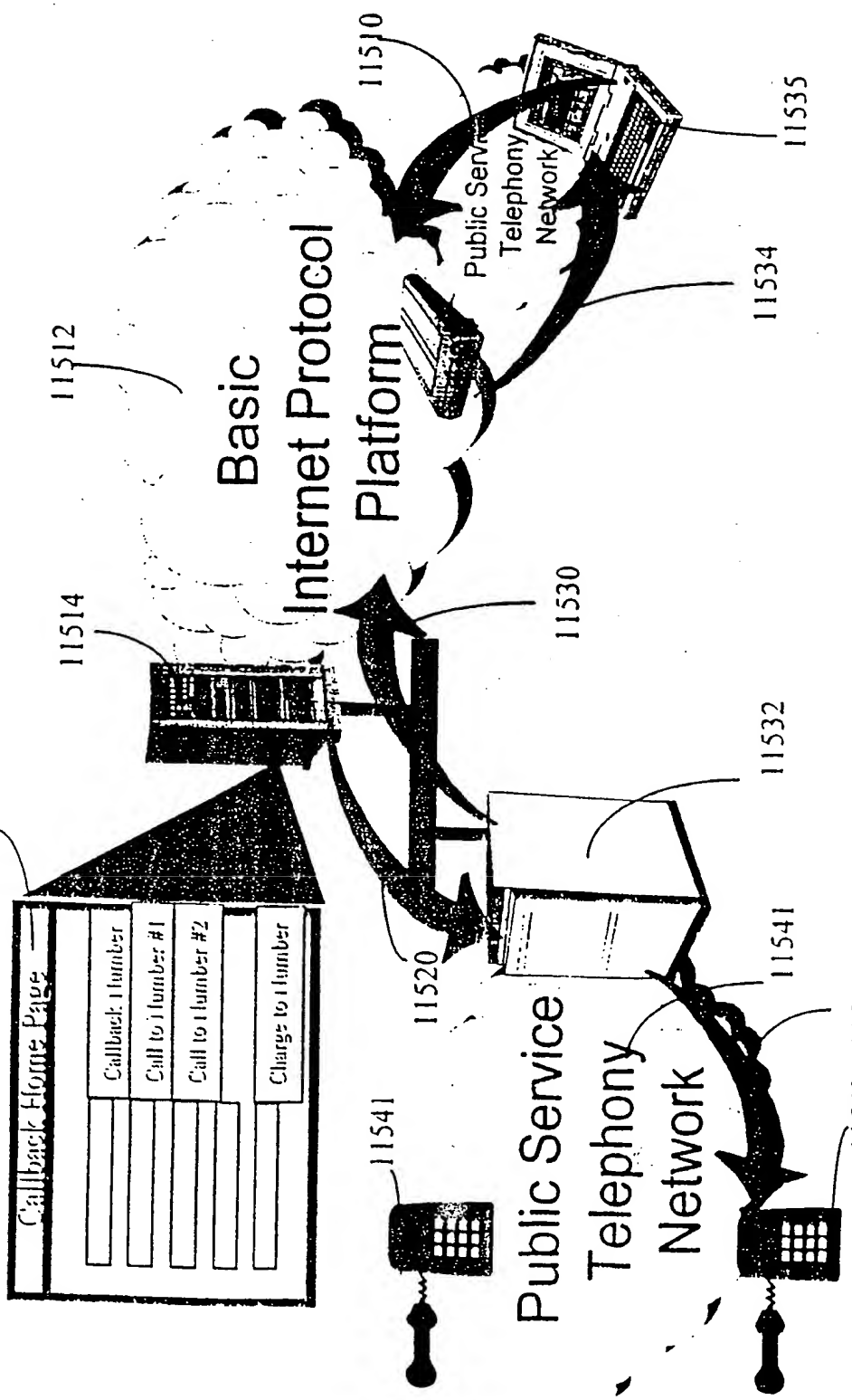

11419
11410
11412
11437
11435
11414
11411
11430
11432
11420
11440
11445
11447
11446
Basic Internet Protocol Platform
Public Service Telephony Network
Callback Home Page
Callback Number
Call to Number #1
Call to Number #2
Charge to Number

FIGURE 115


Callback Home Page
Callback Number
Call to Number #1
Call to Number #2
Charge to Number
11511
11512
11514
Basic Internet Protocol Platform
11510
Public Service Telephony Network
11535
11534
11530
11532
11520
11541
11540
11542
Public Service Telephony Network